

What is claimed:

1. A method for forming a multicellular ceramic article, the method comprising:
  - a. forming a mixture of components comprising inorganic ceramic powder materials and organic constituents including an oil-based component having a flash point;
  - b. mixing and plasticizing the components to form a plasticized mixture;
  - c. shaping the plasticized mixture into a green ceramic article;
  - d. drying the green ceramic article;
  - e. removing a portion of the oil-based component from the dried green ceramic article by flowing a heated gas longitudinally through the green ceramic article; and,
  - f. firing the green ceramic article having a portion of the oil-based component removed, to develop the product structure.
2. The of claim 1 wherein the ceramic article is a cellular monolith.
3. The method of claim 2 wherein the cellular monolith is a honeycomb.
4. The method of claim 3 wherein the heated gas is flowed at a rate of 0.2 to 8 standard cubic feet per minute (scfm).
5. The method of claim 4 wherein the heated gas is flowed at a rate of 4 to 8 scfm.
6. The method of claim 5 wherein the heated gas is at a temperature which heats the green ceramic article below the flash point of the oil-based component.
7. The method of claim 6 wherein the gas is at a temperature which can heat the green ceramic article to between 110°C to 165°C.
8. The method of claim 7 wherein the heated gas is air.
9. The method of claim 8 wherein the air is maintained at a temperature of between 120°-140°C.

10. The method of claim 7 wherein the heated gas is nitrogen (N<sub>2</sub>).
11. The method of claim 10 wherein the air is maintained at a temperature of between 155°-160°C.
12. The method of claim 10 wherein the N<sub>2</sub> gas is recirculated.
13. The method of claim 1 wherein at least 70% of the oil-based component is removed.
14. The method of claim 13 wherein at least 85% of the oil-based component is removed.
15. The method of claim 14 wherein at least 95% of the oil-based component is removed.
16. The method of claim 1 wherein the portion of oil-based component that is removed is reused in step a.
17. In the process of making honeycomb articles by forming and shaping into a green body, a plasticized powder mixture comprising powder material, a binder, a solvent, and an oil-based component, the improvement which comprises removing the oil-based component after drying and prior to firing of the green body by flowing a gas at a temperature and rate sufficient to remove a portion of the non-solvent.
18. An apparatus for removing oil-based components from green ceramic articles, comprising:
  - a processing chamber for receiving the green ceramic articles;
  - a gas system coupled directly or indirectly to the processing chamber, and comprising a gas source, a heater for heating the gas, and a fan for controlling the velocity of the gas;
  - a gas system controller in communication with the processing chamber, for controlling the gas system;
  - a heat exchanger couple directly or indirectly to the processing chamber for cooling the gas carrying the oil-based components, exiting the processing chamber;

a condensation chamber coupled directly or indirectly to the heat exchanger for condensing the removed oil-based components in the gas; and,  
an exhaust system.

19. The apparatus of claim 18 further comprising a power adjustable microwave system coupled directly or indirectly to the processing chamber.

20. The apparatus of claim 19 wherein the microwave system comprises a microwave generator and a microwave controller.

21. The apparatus of claim 20 wherein the microwave source is operated at a power level of up to 400 Watts per 90 cubic inches of ceramic article.

22. The apparatus of claim 21 wherein the power level of the microwave source is 100 W, per 90 cubic inches of ceramic article.

23. The apparatus of claim 18 wherein the processing chamber comprises a support device for receiving and holding the green ceramic articles.

24. The apparatus of claim 23 wherein the support device comprises a perforated base and a plate overlaying the base, the plate comprising a first end and a second end, and a set of holes sized to fit the ceramic articles, the holes extending from the first end to the second end of the plate, the holes being in communication with the perforated base.

25. The apparatus of claim 24 wherein the support device comprises a base having a top end and a bottom end, and a set of apertures cut into the base adjacent the top end but not extending to the bottom end, the set of apertures sized to the dimensions of the ceramic articles, each aperture further having a plurality of perforations extending through the bottom end of the base.

26. The apparatus of claim 25 wherein the processing chamber comprises a plurality of support devices arranged vertically along the length of the processing chamber.

27. The apparatus of claim 26 wherein the processing chamber is maintained at a pressure of 100 kPa to 130 kPa.